### WCET Challenge 2008: Participation

<table>
<thead>
<tr>
<th>Tool</th>
<th>Source</th>
<th>Type</th>
<th>ARM7/iF-DEV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>participating</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bound-T</td>
<td>Tidorum</td>
<td>static</td>
<td>yes</td>
</tr>
<tr>
<td>Chronos</td>
<td>NUS</td>
<td>static</td>
<td>yes</td>
</tr>
<tr>
<td>Heptane</td>
<td>IRISA</td>
<td>static</td>
<td>yes</td>
</tr>
<tr>
<td>MTime</td>
<td>TUW</td>
<td>hybrid</td>
<td>yes TBC</td>
</tr>
<tr>
<td>OTAWA</td>
<td>IRIT</td>
<td>static</td>
<td>yes</td>
</tr>
<tr>
<td>RapiTime</td>
<td>Rapita</td>
<td>hybrid</td>
<td>yes</td>
</tr>
<tr>
<td>TuBound</td>
<td>TUW</td>
<td>static</td>
<td>no</td>
</tr>
<tr>
<td><strong>not participating</strong></td>
<td></td>
<td></td>
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<tr>
<td>aiT</td>
<td>AbsInt</td>
<td>static</td>
<td></td>
</tr>
<tr>
<td>SWEET (?)</td>
<td>MdU</td>
<td>static</td>
<td></td>
</tr>
<tr>
<td>SymTA/P</td>
<td>IDA</td>
<td>hybrid</td>
<td></td>
</tr>
<tr>
<td>TimeBounder</td>
<td>KAIST</td>
<td>static?</td>
<td></td>
</tr>
</tbody>
</table>
WCC 2008: Benchmark quality

• More portable C code
  – use “typedef” with C99 standard-sized types
    • eg. “uint_least8_t” when the range 0 .. 255 is enough but a wider range is acceptable
  – suits both 8-bit machines and wider machines

• Separate test data from general code
  – favour functions with parameters, not global data
  – but must still embed test data in program
    • for running on real HW without inputs

• Concentrate on “core” tests
  – deprecate the small or special cases
  – try to find more realistic benchmarks
  – PapaBench?
WCC 2008: New benchmarks

- DEBIE-1 DPU SW, courtesy Space Systems Finland
  - instrument control SW; DEBIE-2 now on Columbus/ISS
  - C, 9 source files, 8758 lines, 1710 statements ( ; )
  - three ISRs, three non-ISR threads, deadlines
  - original target 80C32, now portable, eg. ARM7

- Loops and arrays, courtesy Saarland University
  - stress tests for both I- and D-cache analysis

- New benchmark from Mälardalen
  - TBD

- New benchmarks from Vienna
  - TBD

- PowerBench?
  - suggested by IRISA
WCC 2008: Benchmark format

• Define standard analysis tasks
  – WCET of *this* function in *this* context
  – need differential analysis? wrappers?
• Define standard table template for results
  – more easily comparable across tools
• Define analysis tasks for pure flow analysis (how?)
  – eg. SWEET participation
  – how to compare with results of WCET analysis?
  – eg. “what is the maximum number of invocations of *foo*, assuming that the WCET of *foo* is arbitrarily large?”
    • forces WCET analysis to report its flow analysis
    • thus comparable with pure flow analysis
• Instrument with RapiTime
WCC 2008: Suggested common target

- iSYSTEM iF-DEV, € 69,00
  - ARM7, NXP LPC2138
    - 512 KiB flash on chip
    - 32 KiB SRAM on chip
  - USB/JTAG
  - WinIDEA IDE, GCC

- No cache, but ...

- Cache-like flash buffers:
  - prefetch buffer, 128 octets
  - branch target buffer, 128 octets
  - data buffer, 128 octets

- Flash buffers can be disabled
  - constant memory access time (TBC)
WCC 2008: Organization, schedule

• Steering/working group
  – Niklas Holsti, Jan Gustafsson, Guillem Bernat, ...

• Reference group
  – planned to consist of independent, external people
  – industrials (potential tool users) welcome
  – ... delayed...

• March-May benchmarks progressively available
• mid-June closing date for results to be reported at WCET Workshop
• July report at WCET Workshop
• ... website remains open for new benchmarks and results... for next Challenge